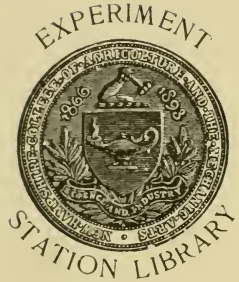
SHOUT
SHARE
IT



Class 639.73

Number N53

Volume 3 cop 2

Source Binding

Received July 1909

Cost

Accession No. 15435

Bulletin 103 October, 1903

NEW HAMPSHIRE COLLEGE

AGRICULTURAL EXPERIMENT STATION

STANDARD MILK

BY FRED W. MORSE

From time to time during the year, and especially about the first of October, some milk producers, who sell their milk to the Boston milk contractors, receive notice that their milk is not up to the legal standard. and that it must be improved or the contractors will refuse to accept it. The Experiment Station has received many inquiries about the legal standard of quality in milk, why one is necessary, and how to reach it.

The foundation of the legal standard in New Hampshire and Massachusetts is the average composition of milk calculated from numerous analyses of samples from herds and individual cows, representing many breeds and various stages of lactation.

The average of nearly 800 published analyses of both American and European samples is as follows :[1]

			Per cent.
Water			87.17
Fat	3 69		
Albumin	0.53		
Casein	3 02	Solids not fat, 9.14	Total solids, 12.83
Sugar	4 88		
Ash	0.71		
Total			100.00

Experience and observation of analysts have modified the above average slightly in the legal standard, while the demands of producers have resulted in a summer standard lower than the average.

The statutory requirements are nearly identical in Massachusetts and New Hampshire and the sections defining standard milk are here given.

[1]Nahrungs und Genussmittel. Koenig, p. 295.

NEW HAMPSHIRE STATUTE

"In all proceedings under this chapter, if the milk is shown upon analysis to contain less than thirteen per cent. of milk solids, or to contain less than nine and one half per cent. of milk solids exclusive of fat, or to contain less than three and one half per cent. of fat, it shall be considered evidence of adulteration except during the months of April, May, June, July, August, and September, when milk containing less than twelve per cent. of milk solids, or less than three per cent. of fat, shall be considered evidence of adulteration, or if, in the case of skim-milk, it shall contain more than ninety-one per cent. of water and less than nine per cent. of milk solids exclusive of fat, it shall be considered evidence of adulteration."[1]

MASSACHUSETTS STATUTE

"In all prosecutions under this chapter, if the milk is shown upon analysis to contain less than thirteen per cent. of milk solids, or to contain less than nine and three-tenths per cent. of milk solids exclusive of fats, or to contain less than three and seven-tenths per cent. of fat, it shall be deemed for the purposes of this act to be not of good standard quality, except during the months of April, May, June, July, August, and September, when milk containing less than twelve per cent. of milk solids, or less than nine per cent. of solids exclusive of fats, or less than three per cent. of fat, shall be deemed to be not of good standard quality."[2]

A standard of quality is right and just when based on a proper foundation, and nothing can be more reasonable for such a basis than the average quality of the product. In the retail milk trade, the consumer usually pays a fixed price, and it is only fair that he should always get an average quality of product. To insure this, our state has provided for boards of health and inspectors, who are frequently to examine the quality of the milk delivered by milk-men to their customers. No data is at hand giving the results of such an inspection in this state. In Massachusetts, the State Board of Health, since the present statute was enacted, has reported about 6,000 examinations yearly, of which approximately thirty per cent. showed the milk to fall below the standard.

[1]Session Laws, N. H., 1901, Chap. 101, Sec. 18, p. 609.
[2]State Board of Health, Mass. Rept., 1901, p. 433.

In order to protect themselves and their customers, the milk peddlers, the Boston contractors have established their own chemical laboratories, in which every producer's milk is periodically analyzed. If any lot falls below the standard, the producer is not prosecuted ; but instead is warned, and if no improvement results, the contractor will no longer buy his milk. That this is necessary has been verified over and over again by the results of analyses made in this laboratory. Sample after sample of milk has been found to be far below the average composition in the percentages of total solids and fat.

Without any adulteration some milk may fall below the standard because there must be some milk below the average composition, and some above it. When a farmer has a herd of cows in which the individuals producing poor milk outweigh those yielding good milk, his average product must fall below the standard. To produce standard milk the farmer must select cows whose individual products will blend to make an average quality of milk.

It is always unlikely that any two cows in one herd will give milk that is exactly alike in composition. No experiment station has yet succeeded in feeding cows in such manner that the quality of the milk has been changed in a marked degree. All authorities agree that the composition of milk is dependent on the animal, and like color, form, and size, is modified by breeding. It is well known that our leading breeds of cattle vary in the quality of their milk, when the averages of the breeds are compared.

The Holstein breed is especially apt to fall below the standard. In the report of the Holstein-Friesian Association for 1902, there are given the results of 733 individual tests, none of which was for less than seven days ; and but 126 would pass our winter standard, while 114 would fail to reach the summer standard. These results were obtained, as a rule, from cows in the early stages of lactation.

The results of our tests of herds in this state, for the Ayrshire Breeders' Association, show that the average fat was 3.88 per cent. and the total solids 12.55 per cent.[1]

The published averages for other breeds are as follows:[2]

[1] Bulletin 96, p. 118.
[2] Nahrungs und Genussmittel. Koenig, 1, p. 297.

	Shorthorn.	Guernsey.	Jersey.
Total solids . .	12.8	14.6	14.00
Fat	3.45	5.11	4.18

No breed appears to have all the requirements for a herd of standard milk producers, and the best resource of the farmer is the selection of animals whose mixed milk will meet the requirements of the law and whose yield will be large enough to be profitable. To do this the farmer will be much benefited by having his individual cows tested from time to time.

The Babcock test will give satisfactory results and should be within the reach of every farmer. The Agricultural Experiment Station will gladly help to the extent of its ability; but will be obliged to charge a small fee sufficient to cover the cost of the work. The amount of this fee will be twenty-five cents per sample for a determination of total solids and ten cents per sample for fat. In preparing samples to be sent to the station, a full day's yield should be represented, since there may be a wide difference in the composition of night and morning yields, owing to the irregularity in milking or other causes.

The cow should be milked dry, and the milk should be strained by itself; then at once dip out about one gill into a clean tumbler or jar and cool the sample as quickly as possible. At the next milking take another sample in the same way and after it is cooled turn night and morning milk together and mix thoroughly.

If it is intended to send the average milk of the herd, it is best to strain all the milk into a large tank, and mix thoroughly by stirring. If it is not convenient to do this, strain each cow's milk by itself, dip into another pail as many gills as there are quarts given, and repeat with each cow. Mix this milk thoroughly and take out a sample.

Not less than a four ounce vial full should be sent, and the vial should be filled to the cork, to prevent any possibility of churning.

In all cases, parties sending milk to the Experiment Station for analysis will be required to pay the express charges, and to notify the Director or Chemist by mail that the sample has been shipped. The notification is especially important in order that the sample may receive prompt attention.

639.73 N53 3 cop. 2
N. H. Exp. Sta.
Buls. 97-129
1903-1907.

639.73
N53
v.3 cop 2